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ZOOLOGICAL SOCIETY OF LONDON.

PAPERS.

26. Observations on some Alcyonaria from Singapore, with a brief Discussion on the Classification of the Family Nephthyidæ. By Edward W. Shann, B.Sc., Demonstrator and Assistant Lecturer in Zoology in the Victoria University of Manchester *.

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(Plates LXI.–LXIII.†)

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A collection of Alcyonaria, made by Mr. W. F. Lanchester and the late Mr. F. P. Bedford during their residence in Singapore, was sent to the Zoological Department at the Victoria University of Manchester. Professor S. J. Hickson kindly

* Communicated by Prof. S. J. Hickson, D.Sc., F.R.S., F.Z.S.
† For explanation of the Plates see p. 527.

entrusted to me the task of identifying the specimens in the collection. The collecting was carried on in shallow water around the coast of Singapore; the precise localities will be cited under the description of the several species. Several examples of Nephthyidæ occur, and this necessitated facing the vexed question of the classification of that family; I shall state below my reasons for adopting the scheme of classification advanced by Kükenthal.

I wish to express my indebtedness to Prof. Hickson for his constant advice as to my procedure and help in the pursuit of literature bearing upon the subject. In the last-named branch of the work I had frequent recourse to an exceedingly useful catalogue of the Alcyonaria prepared by Dr. J. Stuart Thomson. My thanks are also due to Mr. J. T. Wadsworth for preparing the excellent photographs from which Plate LXII. figs. 7, 8, & 9 were made.

In all eleven species are described, of which four are new. The systematic positions of the several species are as follows:—

Order ALCYONACEA Verrill (*pro parte*).

Family Alcyoniidæ.

Sclerophytum pinnulatum, sp. n.

Family Telestidæ.

Telesto rupicola F. Müller.

Family Nephthyidæ.

Nephthya bedfordi, sp. n.
Dendronephthya disciformis Kükenth.
Stereonephthya lutea, sp. n.
Paraspongodes crassa Kükenth.

Family Siphonogorgiidæ.

Siphonogorgia variabilis Hickson.

Order GORGONACEA.

Suborder Pseudaxonia.

Family Sclerogorgiidæ.

Suberogorgia suberosa Pallas.

Family Melitodidæ.

Melitodes albitincta Ridley.
Psilacabaria gracillima Ridley.
Wrightella robusta, sp. n.

Order ALCYONACEA.

Family Alcyoniidæ.

Genus Sclerophytum.

Sc. pinnulatum, sp. n. (Pl. LXII. fig. 7; Pl. LXIII. fig. 10.)

A single complete colony was taken just below low-tide mark from Blakang Mati.

In its form and mode of branching the colony closely resembles *Sc. palmatum* Pratt (1903). As in the last-named species, the colony (fig. 7) is erect, branched, and shows a marked lateral compression. The total height is 88 mm., of which the stalk comprises 45 mm. The diameter of the stalk is 31 × 11 mm., and that of the capitulum is 60 × 35 mm. The stalk divides at its distal end into two almost equal primary branches. From these branches spring numerous secondary lobes which are arranged in no definite order. The secondary lobes frequently show lateral compression in their proximal regions, but their terminations are usually bluntly conical, while a few are reniform. The length of these lobes is 12–20 mm., and their diameter 6–9 mm.

The colour of this specimen in alcohol is slate-grey. The consistency is tough; the stem is hard and brittle, but the secondary lobes are soft and fleshy.

The autozoids are of a brown colour and are uniformly scattered over the surface of the secondary lobes. The average distance between two adjacent polyps is ·6 mm. Autozoids are also found on the primary branches almost down to the level of the stalk, but in this region the distance between them is very much greater, viz. 3–4 mm. Many of the autozoids are more or less expanded, but none of them are situated on raised rounded areas such as occur in *Sc. palmatum*. The anthocodiæ are of medium size when compared with those of the genus *Sclerophytum* as a whole; the diameter of an expanded crown is 1 mm., but the polyp-heads appear only half that size when contracted.

The tentacles (fig. 10) form the distinctive feature of this species. They are ·55 mm. in length, compressed, and expanded at the distal end. There is a single row of free well-developed pinnules on each side of a tentacle. The pinnules are ·06 mm. in average length, but the larger ones attain a length of ·10 mm. and a breadth of ·035 mm. The larger pinnules are those which are placed third, fourth, and fifth from the distal end; they become shorter as they approach the base of the tentacle. There are about twelve pinnules in each row.

The stomodæum is long and convoluted. The mesenteries and mesenterial filaments are well marked. No sexual organs were observed.

The siphonozoids, if present, are extremely degenerate. A very few minute diverticula of the superficial canals, which point in the direction of the surface, but never open to the exterior,

may represent rudimentary siphonozoids. The superficial canals form a dense network just beneath the surface of the colony; their diameter is ·044–·120 mm. The vessels of the internal system are clearly defined and circular in cross-section, and are fairly numerous.

Zoochlorellæ are numerous in the superficial canal-system, and occur in less abundance in the interior. They are also found in the endoderm of the polyps, and extend into the tentacles, occupying even the lumen of the pinnules.

The spicules are quite characteristic of the genus *Sclerophytum*, and indeed only differ from those of *Sc. palmatum* in almost insignificant detail. The little knotted clubs average ·16 × ·034 mm., and the spindles are sometimes only ·058 × ·015 mm. These minute spicules only occur immediately beneath the surface. The spicules of the cœnenchyme are fairly numerous and are all of the tuberculate warted type; they vary considerably, however, in shape and size. The majority are spindles which narrow rapidly towards their ends to rather acute points; their measurements range from ·4 × ·11 mm. to 3·0 × 45 mm. Irregularly branched forms are by no means uncommon.

The following considerations are advanced as an apology for the creation of a new species of *Sclerophytum* based on the examination of a single specimen.

This colony had been assigned in a preliminary investigation to the species *Sc. palmatum* Pratt (1903), and at first sight this diagnosis appeared perfectly accurate. The external appearance, and indeed the actual measurements, agree closely with the description of the type specimen. The characters and distribution of the spicules, the well-marked mesenteries and mesenterial filaments, the rudimentary condition of the siphonozoids, the orientation of the canal-systems, and the distribution of the zoochlorellæ, all tend to enhance the resemblance between the two species. It is only when the autozoids are examined that the true specific difference is realized; those of *Sc. palmatum* are distinctly larger than those of *Sc. pinnulatum*. The characters of the tentacles which form the essential divergence of the two species are tabulated below:—

Sc. palmatum Pratt.	*Sc. pinnulatum*, sp. n.
·7 mm. in length.	·55 mm. in length.
Almost of uniform length.	Expanded at distal end.
Possess a double row of rudimentary pinnules down each side.	A single row of free well-developed pinnules down each side.

Sc. pinnulatum could be confounded with no other species of *Sclerophytum*. At the same time, it is of interest to note that a single row of free pinnules has been recorded on either side of the tentacles of *Sc. viride* by Thomson and Henderson (1906). The possession of free pinnules, now recorded for two species of

Sclerophytum, tends to strengthen the relationship of the genera *Sclerophytum* and *Xenia* which has been suggested by Pratt (1903).

Order ALCYONACEA.

Family Telestidæ.

Genus Telesto.

T. rupicola F. Müller.

Carijoa rupicola F. Müller, Arch. Naturg., Jg. 33, 1867, p. 33, tab. 9. figs. 56 & 57.

Telesto (*Carijoa*) *rupicola* Wright & Studer, 'Challenger' Reports, Zool. vol. xxxi. 1889, p. 262.

Telesto rupicola May, Jena Zeitschr. Naturw. vol. xxvi. 1900, p. 58.

Telesto rupicola Hickson & Hiles, Willey's Zoolog. Res. 1900, p. 496, tab. 50. figs. 1 & 2.

Telesto rupicola Thomson & Henderson, Marine Fauna of Zanzibar, 1906, p. 434.

Telesto rupicola H. Laackmann, Zoolog. Jahrb. Supp. 11, Heft 1, 1908, p. 81, Taf. 2. figs. 1, 2; Taf. 3. fig. 3.

Although the only species of *Telesto* previously recorded from Singapore is *T. prolifera* v. Koch, the numerous small colonies in this collection appear to bear a closer resemblance to *T. rupicola*, and are therefore described under that name.

The largest of these colonies is of a grey hue. Its longest axial polyp measures 85 mm. in length, it is 3 mm. in diameter at the base and 1·25 mm. at the top. It bears six lateral polyps, the longest of which measures 24 mm. Anthocodiæ arise at frequent, but pretty regular intervals, both from the axial and lateral polyps; their average length is 3 mm., and breadth 1·5 mm. The majority of the other specimens are pale yellow and of smaller size. All these forms were obtained in shallow water near Singapore. Some of the exact localities read as follows: Pulo Brani, 6 fms.; Pulo Brani, 5–10 fms.; Blakang Mati, below low tides; Tanjong Pagar, 10 fms.

Previously recorded from Rio de Janeiro (F. Müller); Brazilian coast (Munich Museum); Blanche Bay, New Britain (Hickson & Hiles); Zanzibar (Thomson & Henderson); Bahia ('Challenger').

The spicules show a very wide variety of forms. Not only is this the case, but a different selection of spicules was found in each of the five specimens examined.

One specimen contained spicules very much resembling those of *T. riisei*. Indeed, the two species are probably very closely related, for Laackman (*op. cit.* pp. 72 & 82) is at some pains to distinguish between them. It should be remembered, however, that *T. riisei* has not yet been recorded from the Old World.

A very small specimen of a pale yellow colour was examined

and found to bear many points of resemblance with *T. prolifera*; the spicules, for instance, agree well with those figured by Laackmann for that species (*op. cit.* p. 87), and the stem walls are very thin. At the same time, it was taken from the same locality (Pulo Brani) as one of the larger specimens which undoubtedly belongs to the species *T. rupicola*. Moreover, another specimen was intermediate in every particular between the above exceptional form and the larger examples, which had been assigned without difficulty to *T. rupicola*. As this small specimen was evidently very young, one would not wish to attach too deep a significance to the observations made or to draw any hasty conclusions from them. At the same time, it is well within the range of possibility that the accumulation of such knowledge may lead eventually to a reduction in the number of species of *Telesto*.

An Historical Summary of the Genera *Nephthya*, *Dendronephthya*, and *Stereonephthya*, with reasons for retaining the definitions of these genera of the family Nephthyidæ as enumerated by Kükenthal.

Genus Nephthya Savigny.

1817. *Nephthée* Savigny, Deser. de l'Égypte, Hist. Nat. Suppl. i. Atlas, Polypes, tab. 2. fig. 5.
1828. *Nephthea* Audouin, Explication sommaire des Planches de polypes de l'Égypte et de la Syrie, publiées par Jules-César Savigny dans: Description de l'Égypte, vol. xxiii. Paris.
1834. *Nephthya* Ehrenberg, Die Corallenthiere des Rothen Meeres, p. 284.
1846. *Nephthya* Dana, 'Zoophytes,' Philadelphia, p. 610.
1857. *Nephthya* Milne-Edwards, Histoire Naturelle des Coralliaires, vol. i. p. 127.
1877. *Nephthya* Klunzinger, Die Korallthiere des Rothen Meeres, Th. 1, p. 33.
1887. *Nephthya* Studer, in Arch. Naturg., Jg. 53, vol. i. pp. 19, 20.
1887. *Nephthya* (pars), Danielssen, in Norske Nordhavs Exp. vol. v. p. 82.
1889. *Nephthya* and *Spongodes* (pars) Wright & Studer, 'Challenger' Reports, Zoology, vol. xxxi. p. xxv.
1895. *Spongodes* (pars) Holm, in Zool. Jahrb., Bd. 8, p. 24.
1895. *Spongodes* (pars) Kükenthal, in Zool. Anz., Jg. 18, p. 428.
1896. *Nephthya* Kükenthal, in Abh. Senckenb. Ges. Frankfurt, vol. xxiii. pp. 89–91.
1899. *Nephthya* May, in Jena Zeitschr. Naturw. vol. xxxiii. p. 156.
1903. *Nephthya* Kükenthal, in Zool. Jahrb., Bd. 19, p. 141.

In 1817 Savigny described two genera of Nephthyidæ to which he gave the names *Ammothée* and *Nephthée*. Audouin (1828),

to whom fell the task of describing Savigny's plates, believed that Savigny's Tab. 1. fig. 8 represented *Ammothée*, and that Tab. 2. figs. 5 & 6 represented *Nephthée*. The genus *Nephthea*, as the author wrote it, was recognised by Ehrenberg (1834); but at the same time he disputed the interpretation of Savigny's plates, maintaining that Audouin had given the name *Nephthea cordierii* to the form, represented in Tab. 2. fig. 6, which Savigny had intended to call *Ammothée*. Ehrenberg's view has been accepted by all subsequent authors, and it is now generally agreed that Tab. 2. fig. 5, correctly designated by Audouin *Nephthea chabrolii*, represents the type of Savigny's genus *Nephthée*, while Tab. 2. fig. 6 represents his type of the genus *Ammothée*, namely *A. virescens*. There can be no reasonable doubt with regard to the authenticity of origin of the genus *Nephthya*, that is to say, that the genus was based on the description of the species *N. chabrolii*, which is figured in Savigny's Tab. 2. fig. 5. In the case of *Ammothée*, or *Ammothea* as the genus was known for many years, the name was changed to *Lithophytum* by Kükenthal (1903), since that author found that Savigny's type species, *A. virescens*, is identical with a form described forty-two years previously by Forskäl under the name *Lithophyton arboreum*; in deference to the International Rules of Zoological Nomenclature the older name must be retained. Thus it is of little moment whether or not Ehrenberg was justified in disputing Audouin's interpretation of Tab. 2. fig. 6.

Copies of Savigny's plates are extremely scarce, so that it is not always possible for the research worker to examine the original figures; many have probably been compelled to content themselves with descriptions by other authors. With this difficulty in view, Professor Bourne very kindly had photographs taken for Professor Hickson from Savigny's plates, Tab. 2. figs. 5 & 6, in the Radcliffe Library at Oxford. Prof. Hickson has given me permission to publish these figures in this paper, so that they may be readily accessible to all workers on the Nephthyidæ. They are reproduced in Pl. LXI. figs. 1–5 and Pl. LXII. fig. 6.

Ehrenberg (1834) distinguished *Nephthya* from *Ammothea* by the prominence of the polyp-spicules in the former genus, for he says of *Nephthya*:—"polypis in verrucas inermes retractilibus." We see, then, that Ehrenberg recognised the distinction between the genera *Nephthya* and *Lithophytum* (*Ammothea*) which obtains at the present day, namely the presence and absence of armed polyps (polyps with "Stützbündel") in these genera respectively. Ehrenberg's definition of *Nephthya* was recognised by Dana (1846), Milne-Edwards (1857), Klunzinger (1877), Studer (1887), and Danielssen (1887). The numerous new species described during this period were distinguished by their authors, on the one hand from *Ammothea* by the presence of armed verrucæ, and on the other from *Spongodes* Less. by the comparatively slight development of the spicules which formed the armament of

the verrucæ. Wright and Studer (1889) described a specimen under the name *Spongodes nephthyæformis*, concerning which they observe:—"The entire habit of the colony recalls much more that of *Nephthya* than that of *Spongodes*, and this impression is strengthened by the slight development of the spicules surmounting the little heads, whence the colony does not appear so prickly as other species . . . . The species must be referred to the genus *Spongodes*, because the polyps are placed sideways within a bundle of spicules, although these only project slightly." That is to say, Wright and Studer recognised on the anthocodiæ of *Sp. nephthyæformis* the presence of what is now known as a "Stützbündel," and here we have the starting-point of the difficulty of discriminating between the genera *Spongodes* and *Nephthya*. Holm (1895) faced the problem of reconstructing the genus *Spongodes* in the light of the knowledge which had accumulated since Lesson first described the genus in 1834. This author pointed out that *Spongodes nephthyæformis* W. & St. is identical with *Nephthya chabrolii* Audouin, and added that *N. chabrolii* differs from *Spongodes* in many characters, such as the branching of the colony and the arrangement of the polyps: on these characters one can establish two genera, but it is necessary then to add to the genus *Nephthya* many species hitherto included in the genus *Spongodes*, including the type *Sp. celosia*. Though Holm shrank from submitting a well-known type like *Spongodes celosia* to such treatment, he proceeded fearlessly to include all the species of *Nephthya*, including the type *N. chabrolii*, within the genus *Spongodes*; he retained *Nephthya*, however, as a subgeneric title. Here was a step in the direction of elucidation; *Nephthya* and *Spongodes*, as hitherto defined, were shown to be synonymous; but Holm's solution of the problem threw too great a burden on *Spongodes*. Kükenthal (1895), writing during the year in which Holm's paper was published, accepted the genus *Spongodes* in its new distended form; but the term *Spongodes* had become so obviously cumbersome that this author (Kükenthal), in a later paper*, reinstated *Nephthya* with full generic honours. In this paper Kükenthal gave a summary of the family Nephthyidæ, and divided the various genera into two groups as they possessed or lacked a "Stützbündel"; he summed up his remarks as follows:—"Innerhalb der Familie der Nephthyiden ist als wichtigstes Merkmal zu betrachten, ob die Polypenköpfchen terminal auf ihrem unteren Teile, dem Stiele, sitzen oder seitlich davon. Letzterer Fall tritt stets dann ein, wenn sich auf einer Seite, der oberen, ein Bündel Spicula besonders stark entwickelt: das Stützbündel." The genera possessing a "Stützbündel" were distinguished from one another by the disposition of the polyps on the colony, as Holm (1895) had already suggested; the name *Nephthya* was applied to forms resembling the original type *N. chabrolii* Audouin, in which the polyps are collected on branchlets, the latter being arranged in catkins or lappets, and the name *Spongodes* was

* Abh. Senckenb. Ges. Frankfurt, vol. xxiii. p. 88 (1896).

retained for forms in which the polyps are disposed sporadically or in bundles. The net result of this reformation was the inclusion in the genus *Nephthya* of all forms hitherto included in the "Spicatæ" group of the genus *Spongodes*.

In adopting this means of classification it became necessary to include *Sp. celosia*, Lesson's type of the genus *Spongodes*, in the emended genus *Nephthya*; nevertheless, the name *Spongodes* was retained by Kükenthal for his other emended genus, since the latter included a large number of forms which during many years had been described under *Spongodes*. The definition of the genus *Nephthya* given in the paper under consideration runs thus :—"Nephthyiden mit 'Stützbündel.' Die Kolonie ist buschig verästelt, die meist Kurzen und nur vereinzelt sterilen Stammteile sind durch einen abgeflachten, oft membranosen Basalteil verbunden. Die Polypen stehen in grosser Zahl und zeimlich gleichmässig verteilt auf den Steinzweigen, die dadurch die Form von ährenförmigen Lappen oder 'Katzchen' erhalten. Hervorragende Spicula der Polypenköpfchen fehlen." May (1899) accepted the foregoing definition of the genus *Nephthya*, and in his 'Revision of the Nephthyidæ' (1903) Kükenthal has not had occasion to modify it.

A "Stützbündel."

The crucial point in Kükenthal's classification of the Nephthyidæ lies in the definition of the term "Stützbündel." Much of the opposition to the above classification has arisen through the different interpretations which various authors have attached to the term. Kükenthal, to whom we owe the word, uses it in an extremely comprehensive sense, the range of which can be circumscribed, however, by the following limits :—

A "Stützbündel" is an aggregation of spicules disposed along the abaxial aspect of an anthocodia and lying approximately parallel to its axis. The spicules are usually spindle-shaped; they are not infrequently larger than those from any other portion of a given specimen, and one or two of them commonly, but not invariably, reach from the apex of the polyp-stalk into the substance of the colony. A few of the spicules in a characteristic example protrude beyond the polyp-head, but such a condition is not essential.

A definite "Stützbündel" may not be recognisable in every polyp of a given colony; but if such is present it will appear most obvious in the younger polyps near the distal ends of the branches. A specimen in which a "Stützbündel" is demonstrable, whether or not in *every* polyp, must be classified as possessing a "Stützbündel."

In the genus *Lithophytum*, which closely resembles *Nephthya* in external appearance, the anthocodiæ being massed on small terminal lobes or lappets, there is no "Stützbündel." The anthocodiæ contain very few spicules, some of which are loosely arranged *en chevron* along the abaxial surface. Both the small size and oblique position of the spicules so arranged prevent their being described as forming a "Stützbündel."

Nephthya bedfordi, sp. n. (Pl. LXII. fig. 8; Pl. LXIII. figs. 11, 12.)

Two specimens which, while conforming with the characters described above for the genus *Nephthya*, fail to agree in detail with any of the large number of forms hitherto described, have necessitated the creation of a new species of this genus.

The colony (fig. 8) is bilaterally compressed, the growth is bushy, and the major diameter of the capitulum is approximately equal to the total height, including the stem. The consistency is tough and leathery. The stem, which shows signs of bilateral compression, is short, and gives rise at its distal extremity to a variable number of main branches. These main branches are again divided into unequal secondary branches. From both main and secondary branches spring the short terminal lobes. The latter are conical in shape, but rounded; on them the anthocodiæ are tolerably evenly distributed. As the polyps are situated very close together, and the terminal lobes are exceedingly numerous, the whole capitulum appears to be covered with anthocodiæ. The polyp-heads when at rest make an acute angle with their stalks. The latter scarcely protrude from the colony, with the result that the polyp-heads are very closely apposed to the surface from which they arise.

Colour in alcohol cinder-grey, polyps brown.

Locality: below low-tide mark, Blakang Mati.

Detailed measurements:—

Region measured.	*Specimen I.*	*Specimen II.*
Total height	60 mm.	42 mm.
Height of stem	17 mm.	14 mm.
Diameter of stem	18 × 10 mm.	12 × 10 mm.
Height of capitulum.....	43 mm.	28 mm.
Breadth of capitulum	52 × 20 mm.	45 × 20 mm.

In both specimens the length of the terminal lobes is about 4 mm., but the variation in this respect is between 3 and 6 mm. The diameter of the terminal lobes is from 3 to 4 mm. The edges of adjacent polyps are seldom more than ·175 mm. apart. The polyp-heads have an average length of 1·1 mm. and diameter of ·6 mm.

The spicules show a wide range in size and shape. The smallest forms are found in the tentacles, where they are arranged in no very definite order, but for the most part lie at an acute angle with the axis of the tentacle. The tentacle-spicules are minute spiny spindles, some of which are straight, others crescentic. The polyp-spicules (fig. 11, *f*) are very brittle, longitudinally striated spindles. They are straight or curved, and usually smooth, but sometimes bear a few minute spines. It is difficult in most cases to discern an arrangement of the polyp-spicules *en chevron*, but some of the polyps show such a condition more clearly than others.

The "Stützbündel," though undoubtedly present, is very ill-defined. From four to six spindles can usually be observed along the abaxial surface of each anthocodia, but in no instance do these protrude beyond the polyp-head. It is exceedingly difficult to dissect out a single polyp with its supporting spicules intact; some preparations were obtained, however, after soaking portions of the branches for twelve hours or more in oil of cloves. A more satisfactory method of observing the "Stützbündel" is obtained by placing one of the terminal lobes, previously cleared in oil of cloves, under a low-power binocular microscope. By this means a stereoscopic view of the polyp and its supporting spicules is obtained, such as is represented in fig. 12. The cortex of the capitulum contains numerous horizontally disposed spindles, some of which are among the largest spicules found in this species; they resemble in type those described from the polyps. In the outer wall of the stem are found small spicules with broad rays (fig. 11, *a*) which are usually numerous, but vary considerably in size and concentration. These forms are covered with warts ·015–·036 mm. long, and interlock with one another, thus accounting for the tough consistency of the stem. Among the forms described above there are also in the outer wall of the stem some larger spindles with remarkable spines (fig. 11, *b*); the latter, which have an average height of ·044 mm. and basal breadth of ·02 mm., are often larger and sharper on one side of the spindle than on the opposite side, and, since the spines all lie approximately in one plane, give the spicule a comb-like appearance. The spicules of the canal-walls (fig. 11, *c*, *d*) are not very plentiful, but are distinguished by their stout appearance. They may be described as very thick, longitudinally-striated spindles, somewhat flattened and bearing low rounded warts. Their ends are either rounded or bluntly pointed, the body of the spicule is straight or slightly curved. Among these regular forms there are found a few branched spicules. The latter resemble the regular forms in structure, but are either triradiate or show short irregular processes springing from the central region of a typical spindle.

The following are characteristic measurements of the spicules, length by breadth, in millimetres:—

(*a*) Polyp (outer)	·3 × ·025	
(*b*) Polyp (inner)	·17 × ·02 ·07 × ·02	·112 × ·023
(*c*) "Stützbündel"	·75 × ·05 ·4 × ·06	·6 × ·05
(*d*) Cortex of capitulum	1·0 × ·075	·9 × ·08
(*e*) Cortex of stem, radiate forms	·115 × ·181	·058 × ·054
	Thickness of branches ·03–·015	
Do. spindles (including spines) ...	·35 × ·125	·22 × ·125
(*f*) Canal-walls, spindles	1·1 × ·19, ·4 × ·08	·85, ·2, ·6 × ·11,
Do. triradiate forms (measured by taking two terminal points as a base line and the third point as the extremity).	·41 × ·4, thickness of ray ·1 ·22 × ·18 thickness of ray ·05	

On applying the key to the species of *Nephthya* given by Kükenthal (1903, p. 145) to the case of *N. bedfordi*, it is seen that this species falls within the group characterised by forms in which the terminal lobes are conical but rounded. The inner polyp-spicules are smaller than the outer; moreover, they have the form of smooth rods. These characters taken together indicate that *N. bedfordi* resembles closely *N. pacifica* and *N. albida*; and, since the spicules do not form a ring around the base of the polyp, it may be inferred that the new species is most nearly allied to *N. albida* Holm, so far as the key to the species can be relied upon. Excepting in the character of the inner polyp-spicules, however, *N. bedfordi* appears to be more nearly related to *N. elongata* Kükenthal than to *N. albida*. This supposition is supported by the fact that *N. elongata* is reported from Ternate, while *N. albida* is a Red Sea form. The points of difference and of resemblance between *N. bedfordi* and its two nearest allies may be seen at a glance in the appended table :—

Character.	*N. elongata.*	*N. bedfordi.*	*N. albida.*
Terminal lobes { Long ...	5	6–3	9
Terminal lobes { Thick ...	3	4–3	7
Polyp-heads { Long	·8	1·1	1
Polyp-heads { Thick	·9–·6	·6	·7
Angle between Polyp and Stalk	45°	Acute.	Right.
Polyp-spicules { Outer ...	·27×—	·3×·025	·3×·03
Polyp-spicules { Inner ...	·13×— (Spiny spindles.)	·112×·023 (Smooth rods.)	·4×·015 (Smooth rods.)
"Stützbündel"	Projects slightly.	Does not project.	Projects slightly.
Spicules of "Stützbündel" Long	1·5	·6	1·2
Spicules of "Stützbündel" Thick ...	...	·05	·12
Spicules of Upper Cortex: Long	·8	1	1·4
Spicules of Upper Cortex: Thick ...	...	·075	·12
Spicules of Lower Cortex: Long	·8	·35–·22	·85
Spicules of Lower Cortex: Thick ...	(Compact.)	·125 (Comb-like and radiate forms.)	·22
Spicules of Canal-walls: Long	1·2	1·1–·4	1
Spicules of Canal-walls: Thick ...	(Scattered.)	·2–·08 (Spindle and tri-radiate forms.)	·2
Colour (in alcohol)	Greyish yellow.	Cinder-grey.	Greyish white.
Locality.....	Ternate, 5 fms.	Singapore.	Red Sea.

All measurements are in millimetres.

Lest the use of an artificial key to the identification of species should have led me to overlook a member of the genus not included in the group to which the Singapore specimen apparently

belongs, but at the same time exhibiting a close resemblance to it in structural detail, I have read descriptions of all the species of *Nephthya* which might possibly have proved to be identical with *N. bedfordi*. In no instance is there a greater resemblance between *N. bedfordi* and another species of *Nephthya* than exists between any two established species of that genus. Indeed, the exceedingly feeble development of the "Stützbündel" and the presence in the stem-cortex of exceptionally small, though curiously comb-shaped, spicules are characters which serve clearly to distinguish *N. bedfordi* from any species previously recorded.

Among some unpublished notes by Miss Coward, which Professor Hickson has kindly placed at my disposal, the following paragraph occurs:—

"In his work on the family Nephthyidæ (1903) Kükenthal names a specimen *Nephthya chabrolii*. In doing this he refers to Hickson and Hiles' (1900) description of *N. chabrolii*. These writers, however, state that the spicules of their specimen are just as described by Klunzinger (1877)—that is to say, they do not form a 'Stützbündel.' In the description of his specimen Kükenthal says the spicules only rarely project beyond the polyp-heads—and yet his diagnosis is the *presence* of a 'Stützbündel.'"

This observation came to hand after the account of the new species *N. bedfordi* had been written and the "Stützbündel" described. As stated above, the "Stützbündel" was very poorly developed. I then thought it advisable to examine *N. chabrolii* to satisfy myself as to the nature of the "Stützbündel" in that species. The specimen at my disposal was the identical one described by Hickson and Hiles (1900), in Willey's collection. Preparations, which have been cleared in oil of cloves and examined under the binocular microscope, reveal the presence of distinct bundles of spindles supporting the polyps. One or two of these spicules not infrequently project beyond the polyp-heads. One must admit that *N. chabrolii* is characterised by the presence of a small but clearly defined "Stützbündel." It seemed possible that the "Stützbündel" was so degenerate in *N. bedfordi* that the polyps might be described as being without this characteristic. Were this the case, the specimen in question would come under Kükenthal's definition of the genus *Lithophytum* Forsk. I accordingly made and examined preparations of *Lithophytum arboreum*; but in this case there was no trace of a bundle of spicules on the abaxial surface of the anthocodiæ in the least degree comparable with the condition which I have described in *N. bedfordi*.

The genus *Nephthya*, as at the present time accepted, contains a large series of species showing every gradation in the development of a "Stützbündel." At one end of the series is found such a form as *N. celosia* Lesson, in which one or two of the "Stützbündel" spicules reach 2 mm. beyond the polyp-heads; in the middle *N. chabrolii*, in which they only project slightly; and at the other end *N. bedfordi*, in which they do not project.

Genus Dendronephthya Kükenthal.

1791–97. *Alcyonium* Esper, Pflanzenthiere, pp. 49, 50, tab. 16.
1834. Nec *Spongodes* Lesson, Illustrations de Zoologie, vol. ii. part 2, p. 89.
1834. *Nephthya* (pars) Ehrenberg.
1846. *Spoggodia* (pars) Dana, p. 625.
1857. *Spoggodes* (pars) Milne-Edwards, p. 127.
1862. *Spoggodes* (pars), *Morchellana* Gray, in Proc. Zool. Soc. London, p. 27.
1877. *Spongodes* (pars) Klunzinger, pp. 34, 35.
1889. *Spongodes* (pars) Wright & Studer.
1895. *Spongodes* (pars) Holm, p. 16.
1896. *Spongodes* (pars) Kükenthal, p. 97.
1899. *Spongodes* (pars) May.
1905. *Dendronephthya* Kükenthal, Zool. Jahrb. xxi. p. 526.

The genus *Spongodes* was founded by Lesson (1834) on the type *Sp. celosia*, and for many years workers in the field of the Nephthyidæ found no difficulty in discriminating between *Spongodes* Lesson and *Nephthya* Savigny. I have endeavoured to show in my section on the genus *Nephthya* that as the number of species of the above-mentioned genera increased it became more and more difficult to draw a hard-and-fast line between them; further, that this fact became manifest when, in 1889, Wright and Studer described a specimen as *Spongodes nephthyæformis*, which was subsequently relegated to the genus *Nephthya*, and, indeed, shown to be identical with *N. chabrolii*, the type of that genus. A new distinctive feature was required: such a feature was discovered by Holm and applied in a practical form by Kükenthal. The feature in question is the arrangement of the polyps upon the stem, and its application has already been mentioned above. Kükenthal's (1896) definition of the emended genus *Spongodes* is as follows:—"Polypenstock baumartig verästelt, unterer Stammteil nackt. Die Polypen sind in Bündeln vereinigt oder stehen vereinzelt." Under the genus *Spongodes* thus defined, Kükenthal included as subgenera *Spongodia* and *Spongodes*; he further subdivided the latter into three groups, namely, Glomeratæ, Umbellatæ, and Divaricatæ. May (1899) and others adopted this classification; and so the matter stood until the year 1905, when Kükenthal published the second part of his "Revision of the Nephthyidæ." In this paper was introduced the division of the time-honoured genus *Spongodes* Less. into the two new genera, *Dendronephthya* and *Stereonephthya*, which has provoked such a storm of criticism. It must be remembered, however, that the group *Spongodes* "Spicatæ," and with it the original type *Sp. celosia*, had already been relegated to the genus *Nephthya*; so that the genus *Spongodes*, as then accepted, no longer retained its ancient prestige; moreover, since the genera *Nephthya* and *Spongodes* were shown to be synonymous, Kükenthal was justified by the International Rules of Zoological Nomenclature (Art. 28) in retaining the older name—

Nephthya—to designate the merged genera. The genus *Dendronephthya* is almost synonymous with *Spongodes* (Glomeratæ, Umbellatæ, and Divaricatæ), as defined by Kükenthal in 1896, and *Stereonephthya* has a like relation with his *Spongodes* (Spongodia).

There is no doubt that here, again, Kükenthal was acting in accordance with the International Rules of Nomenclature. Had these Rules been extant at the time Kükenthal published his classification of the Nephthyidæ in 1896, the name *Spongodes* would doubtless have been discarded by him then, for in the second section of Art. 30 it is written: "In no case, however, can the name of the original genus be transferred to a group containing none of the species originally included in the genus." Thus *Spongodes*, as used by Kükenthal in 1896, would not be considered as a valid generic name by those who accept the International Rules of Zoological Nomenclature, which appeared in 1905. One cannot but feel the loss of a name which for nearly a century has been familiar to students of the Alcyonaria, and regret the inconvenience caused in Museums and Zoological Laboratories throughout the world by its suppression. Nomenclature is a matter of convenience and cannot be regulated absolutely by arbitrary laws. Generally speaking, of two synonyms, that which is most familiar to the majority is to be preferred; a more practical reason should be required than a mere regulation before supplanting an old familiar generic name by a new one. If we are required to obey literally the International Rules of Zoological Nomenclature, such everyday names as *Astacus*, *Holothuria*, *Actinia*, *Madrepora*, and many others will be forfeited, as has been *Spongodes*. While regretting that Kükenthal did not exercise his authority in retaining the name *Spongodes*, in deference to his extensive knowledge of the Nephthyidæ and his able reorganisation of that family, I have adopted the term *Dendronephthya* for a genus of Nephthyidæ defined as follows by Kükenthal (1905):—

"Nephthyiden von baumformig verzweigtem Aufbau, deren Polypen stets in Bündeln vereinigt sind, Polypen mit 'Stützbündeln.'"

Dendronephthya disciformis Kükenthal 1905. (Pl. LXIII. fig. 13.)

Three specimens in the collection agree so nearly in all essential features with the description given by Kükenthal (1905) for *D. disciformis* that there is little doubt that they may be assigned to that species. Kükenthal's specimen came from the China Sea.

The largest of the three colonies is 8 cm. high, 7 cm. broad, and 3·5 cm. thick. It was taken off Pulo Brani in 5 fms. of water.

Two other specimens were taken in 7 fms. of water between Pulo Hautu and Blakang Mati. Their measurements, height by breadth by thickness, are $4 \times 4 \times 2{\cdot}5$ cm., and $3{\cdot}5 \times 2{\cdot}5 \times 1{\cdot}5$ cm. respectively.

It may be noted that the two last-mentioned specimens are much smaller than any recorded by Kükenthal. The colour of the upper branches and "Stützbündel" is pink, whereas the typical colour for this region is deep red. Moreover, no radial spicules were observed in the lower portion of the stem.

The exact systematic position of a fourth specimen is rather doubtful; but, until further evidence is forthcoming, it has been deemed advisable to describe the specimen under the specific title *D. disciformis*.

This specimen shows externally the typical "*disciformis*" features. It is 9·5 cm. in height and 8·5 × 3·0 cm. in breadth, thus exceeding somewhat in dimensions the largest specimen described above. The characters and distribution of the spicules are identical with those of typical examples, only excepting those from the lower portion of the stem. The spicules found in the last-mentioned area are spiny clubs (fig. 13), among which are scattered a few of the typical radiate forms. The clubs vary in length from ·70–·27 mm., but the majority are ·45 mm.; the thickness is almost the same even in forms of different length, the average width of the handle of the club is ·05 mm., that of the head ·12 mm., excluding the spines, which sometimes reach ·044 mm. in height. The colour of the branches and "Stützbündel" is a dull yellowish brown, and there are no red spicules such as are found in these areas in all the other recorded specimens. Kükenthal (1905) described a colony whose branches were pale brown and whose polyps were white, but even in this specimen red spicules were observed.

Doubtless one might be led to base a new variety of *Dendronephthya* on the characters of the colony described above, a colony possessing a very characteristic form of spicule which has not been observed, either from the same region or from any other region, in any previously recorded specimen of *D. disciformis*. Such a course might have been adopted had not this aberrant form been taken at the same time and from the same place as the two smaller of the three colonies described above, namely, between Pulo Hautu and Blakang Mati, 8/xii/98, in 7 fms. It seems probable, then, that the species *D. disciformis* is liable to considerable variation in the colour of the terminal branches and "Stützbündel," and in the character of the spicules which are found in the lower region of the stem. The latter phenomenon is very remarkable, and, it is hoped, may act as a check to the frequency with which new species are created to separate two or more specimens of Alcyonaria which only differ from one another in the shape of their spicules.

Genus Stereonephthya Kükenthal.

1869. *Spoggodia* (pars) Gray, in Ann. & Mag. Nat. Hist. (4) vol. iii. p. 128.
1877. *Spoggodia* (pars) Klunzinger.
1889. "Divaricatæ" (*Spongodes*) Wright & Studer.

1895. *Spongodia* (pars) Holm, p. 25.
1896. *Spongodia* (pars) Kükenthal.
1904. *Spongodia* (pars) Holm, Weiteres über *Nephthya* und *Spongodes*.
1905. *Stereonephthya* Kükenthal, p. 694.

"*Spongodes*"-like forms in which the polyps were scattered irregularly over the stem were recognised at an early date, and were classified sometimes as a distinct genus, at others as a subgenus of *Spongodes*, under the name *Spoggodia* or *Spongodia*. Wright and Studer (1889) recognised this group, but included its members in the genus *Spongodes* under the designation "Divaricatæ." Later writers, such as Holm (1895) and Kükenthal (1896), agreed that *Spongodes* and *Spongodia* were synonymous. Hence *Spongodes* dragged *Spongodia* with it in its downfall in 1905. For similar reasons to those stated in the section on *Dendronephthya* I have adopted the new genus *Stereonephthya* which Kükenthal (1905) defined thus: "Sehr starre Nephthyiden, deren Polypen weder in Läppchen noch in Bündeln angeordnet sind, sondern einzeln oder in kleinen Gruppen direkt vom Stamm wie den nicht oder wenig verzweigten Hauptästen entspringen. Polypen mit 'Stützbündeln.'"

Stereonephthya lutea, sp. n. (Pl. LXIII, fig. 14.)

The specimen, on the observation of which this new species is based, agrees in every respect with the diagnosis given by Kükenthal (1905) for the genus *Stereonephthya*. At the same time it possesses characters which serve clearly to distinguish it from other species hitherto described.

The colony is upright and branched. Numerous tapering branches leave the insignificant stalk either singly or in groups, and spread in all directions, but with a distinct tendency to assume an upright position. When they arise in groups, the members forming a group are frequently united for a considerable distance by a common cortex. The primaries sometimes, but not invariably, bear a few stationary branches, which also show a tendency to grow in a vertical direction. From both the primary and secondary branches short lateral lobes are given off at irregular intervals.

Measurements:—

Height of colony		7·5 cm.
Breadth at base		1·5 ,,
Maximum breadth of capitulum		5·5 ,,
Length of primary branches		3·5–5·0 ,,
Breadth of primary branches	at base	1·0–1·5 ,,
	at extremity	0·5 ,,
Length by breadth of secondary branches		1·5 × 0·5 ,,
Length by breadth of lateral lobes		0·5 × 0·5 ,,

The polyps arise sporadically from all parts of the colony. They are closely aggregated on the lateral lobes, and are most scarce on the basal portion of the primary lobes. The anthocodiæ are supported by a "Stützbündel" (fig. 14), three horny spindles of which project ·2–·4 mm. beyond the polyp-head. The polyp-heads make an acute angle with their stalks; the stalk is 1·2 mm. high, the head is 1 mm. in length and ·7–·85 mm. in maximum breadth. The polyps contain thorny spindles of various sizes and a few clubs. These are sometimes placed horizontally, but are more usually oblique, and in the distal area are arranged *en chevron*. These spindles measure ·45 × ·035, ·27 × ·04, ·2 × ·025 mm. Among the above and extending into the tentacles are numerous little spicules which are nearly rectangular in outline; they measure ·110 × ·036, ·095 × ·015, ·050 × ·015 mm. The "Stützbündel" is composed of a number of thorny spindles of a bright yellow colour (they resemble at first sight crystals of sulphur). These spicules are ten in number round the base of the polyp-stalk, but there are only three at the distal end. The four spicules which underlie the point of origin of the polyp-head are semi-lunar in shape, the concave sides facing the polyp-head. The "Stützbündel" spicules reach 1·8 mm. in length and ·12 mm. in breadth. The cortex of the colony derives its characteristic colour from the enormous number of slim yellow spicules which it harbours. There are also thorny spindles; they lie parallel to and very near the surface, and vary very much in size and shape. Some are twice, others only half, the size of the "Stützbündel" spicules. Few are straight, most are semi-lunar or **S**-shaped, and very exceptionally a triradiate form occurs. The ends of the spindles are usually bluntly pointed, but occasionally forms were observed with their ends frayed out into a number of points. The largest measure 3·0 × ·28, 2·7 × ·30, 2·1 × ·15, the smallest ·67 × ·07, ·67 × ·04, ·55 × ·05 mm., but every conceivable intermediate stage can be found. A remarkable feature of this species is the entire absence of spicules from the canal-walls.

The colour of the colony in alcohol is pale yellow, the polyps are cream-coloured.

The specimen was taken in Imbiab Bay, where it was left exposed at the lowest tides.

Two other specimens taken in the littoral region at Teluk Ayer have also been assigned to this species. At first sight they do not resemble closely the type specimen, for they are shorter, broader in proportion, and more bushy in appearance than the colony described above. One of these colonies is 4·3 cm. in height, its base is ·8 cm., and the maximum diameter of the capitulum is 3·1 cm.; the measurements of the other, taken in the above order, are 3 × ·7 cm.: 4·5 cm. The apparent difference in the branching from that of the type is due to the fact that the secondary branches are no larger than the lateral lobes, and that both these kinds of offshoot are relatively numerous. The polyps are arranged much more densely than in the type,

especially at the tips of the branches. The colour of these specimens, moreover, is of a duller yellow. These slight differences appear quite insignificant when one considers that these two specimens resemble the type of *Stereonephthya lutea* in the following important characters:—

The size and shape of the anthocodiæ. The size, distribution, and remarkable sulphur-yellow colour of the spicules; the distribution of spicules agrees even to the disposition of those forming the "Stützbündel"; the large internal canals, with thin walls devoid of spicules.

Genus Parasponges Kükenthal.

P. crassa Kükenthal, 1896.

This species was first described by Kükenthal in 1896, and further reference to it is made by the same author in his 'Revision der Alcyonarien' (1907), where it is described under "Species incerti generis." Two small colonies of a pale brown colour are placed without hesitation in this species.

One colony was taken in 5–9 fms. of water from the New Harbour. It measures 20 mm. in height; the diameter of the capitulum is 13 mm., that of the stem 7·5 mm.

The other colony was taken in 5 fms. of water, the precise locality is not recorded. It measures 20 mm. in height; the diameter of the capitulum is 11 mm., and the stem is broken.

The only important character in which these specimens differ from the type is the size of the spicules in the stem-cortex. Measurements, length by breadth in millimetres, for three of the largest spicules from this region are 1·2 × ·18, 1·0 × ·15, ·95 × ·22. Kükenthal found spicules measuring as much as 1·8 × ·24 mm. in the stem-cortex. The spicules from the Singapore specimens show, however, the typical warts (·02 mm. high).

Previously recorded from Ternate, at a depth of 30 fms.

Family Siphonogorgiidæ.

Genus Siphonogorgia.

S. variabilis Hickson (olim *Chironephthya variabilis* Hickson).

Two beautiful little specimens taken in 10 fms. of water south of Blakang Mati are referred to this very variable species. Each possesses a very slender stem, from the apex of which two main branches are given off, so that the appearance of the colony is roughly Y-shaped. These primary branches give rise to secondary branches, which in one or two cases are again divided. The polyps occur most frequently on the tips of the branches, but a few are scattered on all portions of the colony except the stem.

Measurements:—

	Specimen A.	*Specimen B.*
	mm.	mm.
Height of stem	18	11
Diameter of stem	6	3
Length of primary branches	23 and 23	24 and 18

The spicules are of the usual shape and of medium size, and assume the colour of the part of the colony in which they are embedded. The large warty spindles of the cœnenchym are tinted with mauve and do not exceed 3·0 × ·3 mm. In the polyp-area the spindles are more frequent than the clubs; all the polyp-spicules are more or less bent, they are either bright red or bright yellow in colour, and the larger ones measure ·6 × ·05 mm., ·47 × ·065 mm. (the red spicules mainly compose the "crown," the yellow ones the "points").

The colour of the colony in alcohol is a delicate pinkish mauve. The polyps are deep red, and the tentacles bright yellow. It is difficult to conceive how the colouring could have been more vivid or the blended tints more pleasing even before these little colonies were removed from their natural habitat.

For a list of the colour-variations to which this species is liable to run, see Hickson's "Alcyonaria of the Maldives," Part I. p. 488 (under *Chironephthya variabilis*), and Thomson and Simpson (1909, p. 125).

Previously recorded from Mahlos Atoll, S. Nilandu, Persian Gulf, Andamans, and the Arakan Coast.

Order GORGONACEA.

Suborder *PSEUDAXONIA*.

Family Sclerogorgiidæ.

Genus Suberogorgia.

S. suberosa Pallas.

Gorgonia suberosa Pallas, Elench. Zooph. p. 191.
Suberogorgia suberosa Gray, Proc. Zool. Soc. 1857, p. 159.
Sclerogorgia suberosa Kölliker, Icon. Histiol. p. 142, pl. xix. fig. 13 (2).
Sclerogorgia suberosa Studer, Monatsber. K. Akad. Wiss. Berlin, 1878, p. 666.
Suberogorgia suberosa Ridley, Journal Linn. Soc. Zoology, vol. xxi. p. 243.
Suberogorgia suberosa Wright & Studer, 'Challenger' Reports, vol. xxxi. p. 166.
Suberogorgia suberosa Brundin, "Alcyonarien aus dem Sammlung der Zool. Mus. in Upsala," Svenska Vet.-Akad. Handl. xxii. pt. iv.

There is in the collection a bottle which contains a number of fragments, apparently the component parts of a single colony of *S. suberosa*. The basal portion is present and has a diameter of 6 mm.: the diameter of the terminal branches is 2·5 mm. The specimen was taken in about 14 fms. of water off Pasir Panjang.

Previously recorded from the coasts of Western Africa and the West Indies (Pallas and Esper); the Mermaid Straits, Dampier Archipelago, and N.W. Coast of Australia (Studer); Port Denison, Queensland, and Torres Straits ('Alert' Coll.); Mauritius (Coll. Brit. Mus.); Admiralty Islands ('Challenger' Coll.); and Sumatra (Brundin).

Family Melitodidæ.

Genus Melitodes.

M. albitincta Ridley.

This species is represented by numerous fragments, but none of these represents an entire colony. The specimens were taken in 15 fms. of water from Blakang Mati.

Previously recorded from Port Molle, Queensland.

Genus Psilacabaria.

P. gracillima Ridley.

Psilacabaria gracillima, n. gen. et sp., Ridley, Rep. Zool. Coll. H.M.S. 'Alert,' Alcyonaria, p. 363.

After a lapse of nearly three decades this delicate little species is to be recorded once more. It is represented in the collection by four portions of colonies, which show the mode of branching and length of the internodes, and by sundry fragments. None of the colonies are complete, but the largest intact portion measures 45 mm. in height. The internodes vary in length, the majority, however, fall within the range given by Ridley, viz. 12–16 mm. The branches are much more delicate than those of the type, measuring only 1–2 mm. in diameter, as compared with 3–7 mm. In the mode of branching, size of polyps, and details of spicule-distribution the Singapore specimens resemble the type very closely. The spicules show the typical shapes; but they are in each instance somewhat smaller than their prototypes. The colour of the cœnosarc and polyps is fawn, that of the axis white.

Locality. Salát Sinki, in 4–5 fms.

Previously recorded from Port Molle, Queensland, 12–20 fms.; Port Darwin, 8–12 fms.; E. Australia, 42 fms. (Ridley).

Genus Wrightella.

W. robusta, sp. n. (Pl. LXII. fig. 9; Pl. LXIII. fig. 15.)

This species has been formed to include a single well-developed colony, which agrees more closely with *Wrightella* Gray (1870) than with any of the other genera of the family Melitodidæ. The form of the colony differs, in its stouter dimensions and in its erect position, from the members of the four existing species of *Wrightella*; but it was thought expedient to associate it with

these, rather than to create a new genus from the observation of a single specimen.

Wright and Studer (1889, p. xxxvi) give the following definition of the genus *Wrightella*:—"The branches and twigs are compressed; the projecting polyp calyces occur especially on the sides. In the cortex there are foliaceous clubs. There are no nutritive canals in the axis." The specimen fulfils all these conditions.

The single main stem arises abruptly from a strong reticulate base (fig. 9). The base, which is broken at the edges, measures 15 mm. in diameter, and the gaps in its meshes average 1 mm. in diameter. The colony is 120 mm. in height and 45 mm. in breadth (some of the lateral branches are broken, so it is probable that the true breadth exceeded 45 mm.). The branching of the colony is dichotomous, and takes place at the swollen nodes. The nodes are less prominent in the distal branches. All the branching takes place in one plane; the terminal twigs are markedly flattened in the plane of branching. Anastomosis of the upper branches takes place at infrequent intervals. The nodes near the base are globular, having a diameter of 4 mm.; the internodes in this region are circular in section, their diameter is 2·5 mm., which is slightly exceeded by their length. The internodes beyond the lowest three become more elongated and show an average length of 10 mm. The terminal twigs are only 1 mm. wide. The varrucæ, which measure ·75 × ·75 mm., are not densely crowded, and show a tendency to arrange themselves on the lateral aspects even of many of the lower branches, but more especially in the terminal twigs. Both cortex and verrucæ are yellow in colour. The axis is white, and is not traversed by nutrient canals.

The precise locality is not recorded, but, like the other specimens in this collection, it was taken in shallow water near Singapore.

The spicules attain all manner of shapes (fig. 15); they are quite colourless. The foliaceous clubs characteristic of the genus *Wrightella* are present in large numbers, and show the following range in measurement: length by breadth ·27 × ·12 mm., ·15 × ·06 mm.; handles of clubs ·02 mm. in diameter. Numerous spindles occur, some are foliaceous and measure ·27 × ·07 mm., ·20 × ·08 mm., ·12 × ·06 mm.; others are spiny, the spines frequently being confined to the central region, and measure ·22 × ·05 mm., ·17 × ·03 mm., ·12 × ·03 mm. A few stellate forms are found which have a diameter of ·10–·15 mm. Minute scales abound; they measure ·05 × ·025, ·036 × ·030 mm., ·028 × ·014 mm.

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EXPLANATION OF THE PLATES.

Plate LXI.

*Fig. 1. *Ammothea virescens* Sav. (= *Lithophytum arboreum* Forsk.), entire colony; Savigny, Tab. 2. fig. 1. 1.
*Fig. 2. *Nephthya chabrolii* Audouin, terminal lobe magnified; Savigny, Tab. 2. fig. 5. 2.
*Fig. 3. *N. chabrolii*, single polyp magnified, lateral aspect; Savigny, Tab. 2. fig. 5. 3.
*Fig. 4. Same, abaxial axis; Savigny, Tab. 2. fig. 5. 4.
*Fig. 5. Same, more highly magnified; Savigny, Tab. 2. fig. 5. 5.

Plate LXII.

*Fig. 6. *N. chabrolii*, entire colony; Savigny, Tab. 2. fig. 5. 1.
Fig. 7. *Sclerophytum pinnulatum*, sp. n., entire colony; from a photograph, slightly reduced.
Fig. 8. *Nephthya bedfordi*, sp. n., entire colony; from a photograph, natural size.
Fig. 9. *Wrightella robusta*, sp. n., entire colony; from a photograph, × ¾.

Plate LXIII.

Fig. 10. *Sclerophytum pinnulatum*, sp. n., tentacle bearing pinnules, × 245.
Fig. 11. *Nephthya bedfordi*, sp. n., spicules, × 72.
Fig. 12. *N. bedfordi*, terminal lobe bearing polyps, × 25.
Fig. 13. *Dendronephthya disciformis* Kükth. (aberrant specimen), spicules from the stem-cortex, × 72.
Fig. 14. *Stereonephthya lutea*, sp. n., polyp and "Stützbündel," × 72.
Fig. 15. *Wrightella robusta*, sp. n., stem-spicules, × 72.

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* Figures marked thus are reproduced from photographs procured by Professor Bourne, and kindly given by him to me for the purpose.